

CHROMOSOME COUNTS OF TWO THYMELAEACEAE

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The earliest reports of chromosome numbers in the Thymelaeaceae were published shortly after the turn of this century, as incidental remarks, in discussions of endosperm formation, embryo sac development, and parthenogenesis. Chromosome numbers for nearly forty taxa, in seven genera, have been reported, a small percentage considering that several hundred species in fifty-five genera are recognized. The authors of these reports understandably have had little interest in the family as a group and, therefore, rarely have correlated their data with the taxonomic system. Domke's (1934) realignment of the classification down to the generic level has increased taxonomic interest and research of both the revisionary and floristic types. His broad study is based primarily on anatomy and morphology and makes no attempt to include the meager cytological data then available. There have been few opportunities, since that time, to profitably apply cytological information to taxonomic problems because of the nature of the groups under study, i.e., revisionary investigations have been limited to genera which are cytologically unknown.

Although the chromosome counts are restricted, with a few exceptions, to the larger and more accessible genera, i.e., *Daphne*, *Pimelea*, and *Wikstroemia*, even these few reports have demonstrated an interesting biological complexity to the family and some of the accompanying taxonomic consequences. Horticulturists, cytologists, and taxonomists, for example, for considerable time have known *Daphne odora* Thunb. to be sterile. Osawa (1913) attempted to explain this lack of seed development but he misdetermined the chromosome number and succeeded only in precipitating a series of papers on the subject. Okura and Kono only recently (1959) elucidated fully the cytological situation (allotriploidy) which is the basis of the sterility. Cruickshank (1953) discovered, in the Australasian genus *Pimelea*, an interesting polyploid series ranging from diploid to hexaploid species, some gynodioecious, others dioecious,

which will have to be given serious consideration when that group is revised. Apogamy has been reported in the taxonomically troublesome genus *Wikstroemia*, a genus closely related to, if not congeneric with *Daphne*. It is suspected in a number of species on the basis of aborted pollen but has been demonstrated only in *W. indica* C. A. Mey. (Fagerlind, 1940). Some of the difficulties in this genus may stem from this phenomenon. There has been a recent trend toward reporting chromosome numbers and coördinately shifting or erecting additional taxonomic categories to accommodate newly uncovered chromosome-number patterns. This procedure, often accomplished with complete disregard for other factual data and lacking overall perspective of the taxonomic continuity of the group, while hailed in some quarters as a "miracle drug" to "cure" taxonomy is, in reality, a placebo.

It is difficult to obtain living material of this family, excepting the horticulturally important species of the genus *Daphne*. Observations of cytological importance can be made only on living material, necessitating the accumulation of this type of data whenever it is available. During the past year I have been fortunate to obtain living material of *Daphne blagayana* Freyer, an Old World species, and *Daphnopsis americana* (Mill.) J. R. Johnston, a New World species. Somatic chromosome numbers for these species are reported here for the first time.

Daphne blagayana Freyer, $2n = 18$ (*Nevling 101, A*). This low, spreading, Old World species with handsome terminal inflorescences of creamy white flowers (see Curtis Bot. Mag. 124: t. 7579. 1898) is native to subalpine woods of Roumania, Hungary, Yugoslavia, Albania, and Bulgaria. It is related to several other species of horticultural interest such as *D. collina* Smith, *D. sericea* Vahl, and *D. petraea* Leybold. In Europe it is cultivated and considered to have two "forms" (Hodgkin, 1961) one of which flowers two weeks earlier (March in Great Britain) than the other. During the fall of 1961, the Arnold Arboretum was fortunate to receive six rooted shoots from the Arboretum Volcji Potok, Radomlje, Yugoslavia. These shoots were collected

from wild plants which had layered naturally in a habitat of perpetual shade on the cool, moist, north-facing slopes of low hills.

Inasmuch as pollen mother cells were not available for examination, root tips were selected, placed in a saturated aqueous solution of paradichlorobenzene for two hours, rinsed, fixed in three parts absolute ethyl alcohol and one part glacial acetic acid for 30 minutes; hydrolized in 1 N. hydrochloric acid at 55° C. for 20 minutes, rinsed, stained in leuco-basic fuchsin for two hours and squashed. In such preparations a somatic chromosome number of 18 was observed repeatedly. All stages in division were observable.

It may seem unusual that the chromosome number of this well-known species has not been reported previously as there are several papers devoted to its embryo-sac development. These papers, however, are pre-1900, and apparently little attention has been given this species in recent years, except by horticulturists. The chromosome number $2n = 18$ has been reported for nine of ten species of *Daphne*, the only exception being the previously mentioned *D. odora*, a triploid.

Daphnopsis americana (Mill.) J. R. Johnston, $2n = 18$ (*Nevling 102, A*). This New World species of dioecious, small trees is distinguished from other members of the genus by the large, dichotomously branching, terminal inflorescences. It is the most widespread and complex of the genus *Daphnopsis* with seven subspecies (Nevling, 1959). *Daphnopsis americana* ssp. *caribaea* (Griseb.) Nevl. has the most extensive geographical distribution of any of the subspecies, ranging from Nicaragua south through Costa Rica and Panama to Colombia, eastward across northern Venezuela, and north through the Lesser Antilles to Puerto Rico. Immature fruiting material of this subspecies (*R. & E. Howard 15258, A*) was collected, in 1960, from an isolated tree, on a rockslide, on the north slope of Mt. Eagle, St. Croix. Cuttings and mature fruiting inflorescences from this isolated tree were forwarded in February, 1961. The pure white drupes were ovoid, about 8 mm. long and 6 mm. in diameter with a fleshy outer layer and an inner fibrous

one. The extensive fleshy layer, containing compound rhomboidal crystals of calcium oxalate, is lost in the drying process of preparing herbarium specimens. The pseudomonomeric ovary contains a single bi-integumented ovule; the inner integument forms a dark, hard, seed coat while the outer integument forms an outer membranaceous layer. All cuttings failed to strike but a half-dozen seedlings were obtained from less than a dozen seeds, the first germinating in two and one-half months and the last after five months. The sex of seedling plants has not yet been determined.

Root tips from the seedlings were examined cytologically after various methods of treatment, including that used for *Daphne blagayana*. Except for the treatment outlined below, the chromosomes were unsuitable for study due to insufficient chromosomal contraction and poor staining. Root tips were placed in water at 10° C. for 15 hours, fixed and hydrolyzed as in *Daphne blagayana*, rinsed, stained and squashed in aceto-carmin. A somatic chromosome number of 18 was observed repeatedly, with all stages of division being observable and appearing normal. Since this is the first chromosome count to be reported for a member of the Thymelaeaceae from the New World it is interesting to note that it fits the base number of nine as previously reported in the family.

I am indebted to Ing. Igo Oraš, Director *Emeritus* of the Volcji Potok Arboretum, for plants of *Daphne blagayana*, and to Mr. A. J. Oakes, Research Agronomist of St. Croix, for cuttings and fruits of *Daphnopsis americana* ssp. *caribaea*. The editorial suggestions of Drs. C. E. Wood, Jr., and W. R. Ernst, which have substantially contributed to the organization of this note, are appreciated by the author. Special thanks are due to Mr. Alfred Fordham, Propagator of the Arnold Arboretum, for his sympathetic handling of the research materials, without which this paper would not be possible. — ARNOLD ARBORETUM, HARVARD UNIVERSITY.

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CHROMOSOME NUMBER IN STRIPED AND MOUNTAIN MAPLES. — Striped maple (*Acer pensylvanicum* L.) and mountain maple (*Acer spicatum* Lam.) are both common species throughout the Northeast. Their ranges, which extend west to Minnesota and south in the mountains to northern Georgia, are similar. Although both species may attain small tree size, they are of little commercial importance for timber and have attracted only mild interest as ornamentals. Neither species has been investigated cytologically.

The writer has collected both species for chromosome studies from several northern localities. Striped maple collections were from Mifflin and Luzerne Counties in Pennsylvania, and Hampshire County, Massachusetts. Mountain maple was collected in Hennepin County, Minnesota; Delaware County, Pennsylvania; and Middlesex County, Massachusetts.

Entire inflorescences were removed from the trees during the spring, and were fixed for 24 hours in 3:1 alcohol-acetic with a few drops of ferric chloride added. Storage was in 75 percent ethyl alcohol at 10°C. Standard aceto-carmin smear techniques on pollen mother cells were used in the chromosome studies.

It was found that, for both species, meiosis took place before the bud scales had fully separated. Chromosome

counts for all material gave $n = 13$, and no marked meiotic irregularities were noted. Thus both species appear to be diploid over the northern portion of their ranges.

Of the 10 species of maple native to the United States for which chromosome numbers are now available, 8 are diploid and only red and silver maples are polyploid. — FRANK S. SANTAMOUR, JR. GENETICIST, NORTHEASTERN FOREST EXPERIMENT STATION, U. S. FOREST SERVICE, STATIONED AT MORRIS ARBORETUM, PHILADELPHIA, PA., IN COOPERATION WITH THE UNIVERSITY OF PENNSYLVANIA.

ILLINOIS FLORA: NOTES ON LIMNOSCIADIUM, DICLIPTERA, AND IRESINE. — During recent field work I found one of the Umbelliferae that is new to the Illinois flora, an additional stand of *Dicliptera brachiata* (Pursh) Spreng., and one of *Iresine rhizomatosa* Standl., both species rare in Illinois.

Limnoscium pinnatum (DC.) Math. & Const. is a plant of wet places that ranges from Louisiana and Texas, north to southeastern Kansas and southwestern Missouri. On July 14, 1960, I spent some time collecting plants east of Fayetteville, a small community in southeastern St. Clair County, about 25 miles southeast of East St. Louis. One of my collections from a roadside ditch east of the Kaskaskia River was *Limnoscium pinnatum*.¹ This site is almost 300 miles northeast of the range in southwestern Missouri. Herbarium specimens, in the herbarium of the Illinois Natural History Survey (ILLS) and the University of California (UC), have the following label data:

Roadside ditch, east of Fayetteville, St. Clair County, Illinois, July 14, 1960, R. A. Evers 65864.

In a previous article (*Rhodora* 58:49-50) I reported the occurrence of *Dicliptera brachiata* in southern Illinois, east of Joppa, Massac County. That collection was made in 1951. On subsequent trips to this locality I failed to find this species but did discover a stand of another plant rare in

¹I wish to thank Dr. Lincoln Constance, University of California, Berkeley, for identifying the specimen.

Illinois, *Iresine rhizomatosa*. On September 2, 1960, while botanizing the bluffs and floodplain of the Ohio River east of Cave-in-Rock, Hardin County, I found a sizable stand of *D. brachiata* at the base of the bluff. This locality, the second for this species in Illinois, lies over 40 miles northeast of the Massac County site. On October 12, 1961, I revisited the ravine east of Joppa and once more collected *D. brachiata*. The two recent collections have the following label data:

Base of wooded bluffs, east of Cave-in-Rock, Hardin County, Illinois, September 2, 1960, *R. A. Evers* 67398. Wooded ravine, east of Joppa, Massac County, Illinois, October 12, 1961, *R. A. Evers* 72015.

The herbarium sheets of *Iresine rhizomatosa* in the Survey herbarium have the following data:

Wooded ravine, east of Joppa, Massac County, Illinois, September 23, 1952, *R. A. Evers* 35975; September 12, 1961, *R. A. Evers* 71286.

This species formed a colony about one meter in diameter and was very conspicuous along the bank of the intermittent stream in the ravine. — ROBERT A. EVERS, ILLINOIS NATURAL HISTORY SURVEY, URBANA.

ZIZANIOPSIS MILIACEA FROM ILLINOIS. — The robust, perennial, aquatic grass *Zizaniopsis miliacea* (Michx.) Döll & Aschers. has not been previously reported as an established species in Illinois according to information available to the writer. The natural range of this southern wild rice or water-millet is through most of the southern and southeastern states including Tennessee, Kentucky and Missouri. The present locality of the Illinois station for *Zizaniopsis miliacea* is in Montgomery County near Hillsboro. In this locality the plants grow in marginal patches and isolated clumps in shallow water around the shore of Lake Hillsboro. The first specimens were called to the writer's attention by Mr. A. C. Lopinot of the Illinois Department of Conservation. Mr. Lopinot requested identification of the broad-